What is claimed is:

1. A signal processing method for an FM-CW radar which determines relative distance and relative velocity with respect to a target from peak frequencies occurring in an upsweep and a downsweep section of a triangular FM-CW wave wherein,

when said target is a target that has previously been detected, predicted values for the peak frequencies currently detected in the upsweep and downsweep sections are computed from the relative distance and relative velocity previously detected with respect to said target, and it is determined whether any of said predicted values exceeds a detection frequency range and, if there is a peak frequency that exceeds said detection frequency range, said frequency is folded and said folded frequency is taken as one of said predicted values, said method then proceeding to search the currently detected peak frequencies to determine whether there are upsweep and downsweep peak frequencies approximately equal to said predicted values and, if said upsweep and downsweep peak frequency are found, said peak frequency approximately equal to said folded predicted value is folded and said folded peak frequency is used.

2. A signal processing method for an FM-CW radar as claimed in claim 1 wherein, in the case of a peak frequency for which said predicted value is negative, said predicted value is inverted in sign and taken as one of said predicted values, said method then proceeding to search the currently detected peak frequencies to determine whether there are upsweep and downsweep peak frequencies approximately equal to said predicted values and, if said upsweep and downsweep peak frequency are found, said peak frequency approximately equal to said predicted value inverted in sign is inverted in sign and said peak frequency inverted in sign is used.

3. A signal processing method for an FM-CW radar as claimed in claim 1 wherein, in the case of a peak

frequency for which said predicted value exceeds an upper limit frequency of said detection frequency range, said peak frequency is folded with respect to said upper limit frequency and said folded peak frequency is taken as one of said predicted values, said method then proceeding to search the currently detected peak frequencies to determine whether there are upsweep and downsweep peak frequencies approximately equal to said predicted values and, if said upsweep and downsweep peak frequency are found, said peak frequency approximately equal to said folded predicted value is folded with respect to said upper limit frequency and said folded peak frequency is used.

4. A signal processing method for an FM-CW radar as claimed in claim 1 wherein, when said target is not a target that has previously been detected, relative distance (r_a) and relative velocity (v_a) are obtained based on said peak frequencies occurring in said upsweep and downsweep sections,

relative distance (r_b) and relative velocity (v_b) are computed by folding one or the other of said peak frequencies occurring in said upsweep and downsweep sections,

when said relative velocity (v_b) is within a prescribed range, and when the value of said relative distance (r_b) is outside a prescribed range, instantaneous errors (Δr_a and Δr_b) for said relative distances (r_a and r_b) are obtained,

integrated values ($\Sigma\Delta r_a$ and $\Sigma\Delta r_b$) are obtained for said respective instantaneous errors, and

when neither $\Delta r_b \geq \Delta r_a$ nor $\Sigma\Delta r_b \geq \Sigma\Delta r_a$ holds, said relative distance (r_b) and said relative velocity (v_b) computed by folding said peak frequency are employed.

5. A signal processing method for an FM-CW radar as claimed in claim 4 wherein, when computing said

relative distance (r_b) and said relative velocity (v_b) by folding one or the other of said peak frequencies occurring in said upsweep and downsweep sections, if said relative distance (r_a) is not greater than a predetermined value (r_0), the lower of said peak frequencies is folded but, if said relative distance (r_a) is greater than said predetermined value (r_0), the higher of said peak frequencies is folded.

6. A signal processing method for an FM-CW radar as claimed in claim 4 or 5 wherein, when both $\Delta r_b \geq \Delta r_a$ and $\Sigma\Delta r_b \geq \Sigma\Delta r_a$ hold, said relative distance (r_a) and said relative velocity (v_a) obtained without folding any peak frequency are employed.

7. A signal processing method for an FM-CW radar as claimed in claim 4 or 5 wherein, when one or the other of $\Delta r_b \geq \Delta r_a$ and $\Sigma\Delta r_b \geq \Sigma\Delta r_a$ does not hold, a determination as to which data is to be employed is not made until the next cycle.

8. A signal processing method for an FM-CW radar as claimed in claim 4 or 5, wherein said instantaneous errors (Δr_a and Δr_b) for said relative distances (r_a and r_b) are obtained from equations

$$\Delta r_a = \{(v_{ai} + v_{ai-1})/2)\}t - (r_{ai} - r_{ai-1})$$

$$\Delta r_b = \{(v_{bi} + v_{bi-1})/2)\}t - (r_{bi} - r_{bi-1})$$

where r_{ai} and r_{bi} are currently obtained relative distances, r_{ai-1} and r_{bi-1} are previously obtained relative distances, v_{ai} and v_{bi} are currently obtained relative velocities, v_{ai-1} and v_{bi-1} are previously obtained relative velocities, and t is elapsed time between previous detection and current detection.

9. A signal processing method for an FM-CW radar wherein, when said target is not a target that has previously been detected, relative distance (r_a) and relative velocity (v_a) are obtained based on said peak frequencies occurring in said upsweep and downsweep sections,

relative distance (r_b) and relative velocity (v_b) are computed by folding one or the other of said peak frequencies occurring in said upsweep and downsweep sections, and

when said relative velocity (v_b) is within a prescribed range, and when the value of said relative distance (r_b) is within a prescribed range, said relative distance (r_a) and said relative velocity (v_a) obtained without folding any peak frequency are employed.